
FLEXIBLE POLYMERS

FOAM



... we improve your polymer

LUCOBIT RESINS AND THEIR USE IN FOAM APPLICATIONS

GENERAL

Polyolefin foams are a relatively recent development in comparison to other foams such as polyurethane and polystyrene. The main processes were introduced in the 1960s with significant commercial production beginning in the 1970s.

Polyolefins are tough, flexible and resistant to most chemicals. Foams made from polyolefins retain and exhibit most of these properties as well. Most polyolefin foams have a closed cell structure which renders them suitable for applications where elasticity and resiliency are important such as in packaging applications, civil engineering, automobiles, insulation applications, for sports and leisure activities and agriculture.

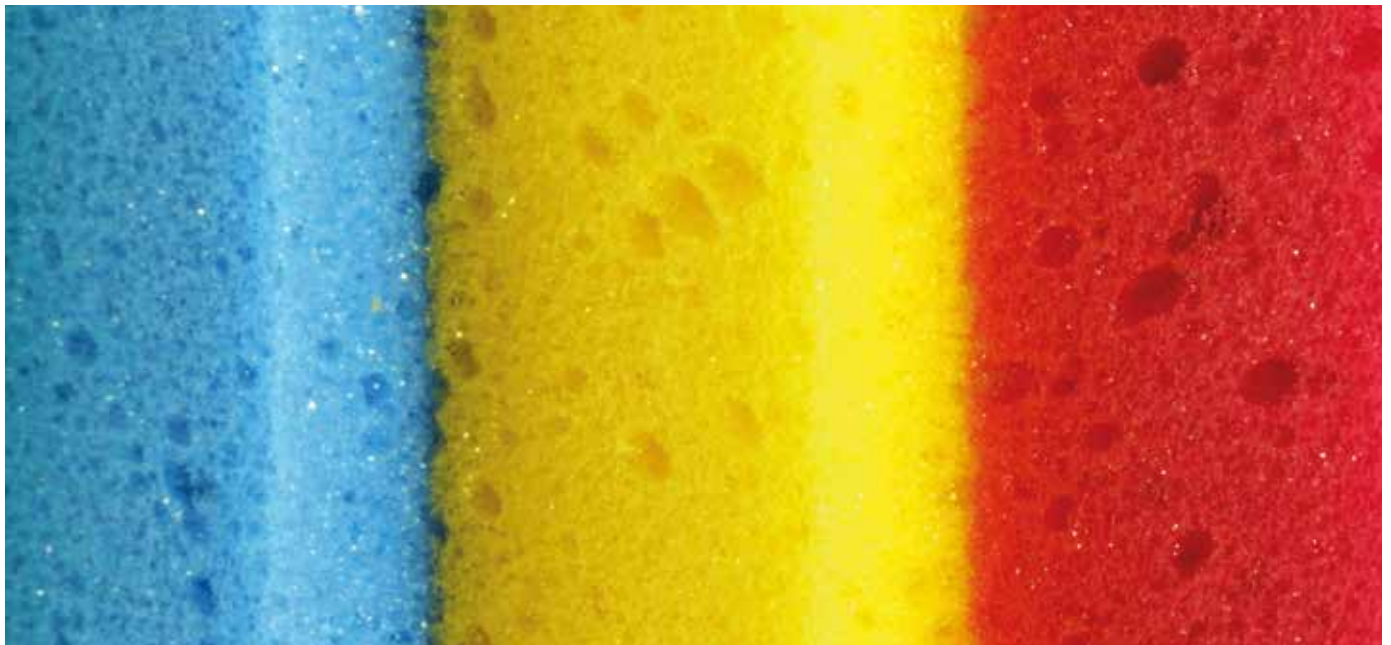
Polyolefins used in foaming applications include polyethylene, polypropylene,... and respective copolymers such as ethylene-butylacrylate (EBA).

Polyolefin foams manufacturing technologies are classified depending on the type of foaming agent used, achieved degree of crosslinking and process machinery/processing equipment.

The following table lists LUCOBIT AG products with their main properties suitable for use in foaming applications:

| PRODUCT | MATERIAL | COLOR | SHORE A | MFR ¹⁾ 190°C / 2.16 KG |
|-------------------|------------------------------|---------|---------|--------------------------------------|
| Lucofin® 1400HN | EBA (16 % BA) | natural | 90 | 1.4 |
| Lucofin® 1400MN | EBA (17 % BA) | natural | 88 | 7 |
| Lucofin® 1492M HG | MAh grafted EBA (17 % BA) | natural | - | 5 ²⁾ |

¹⁾ average ²⁾ example value

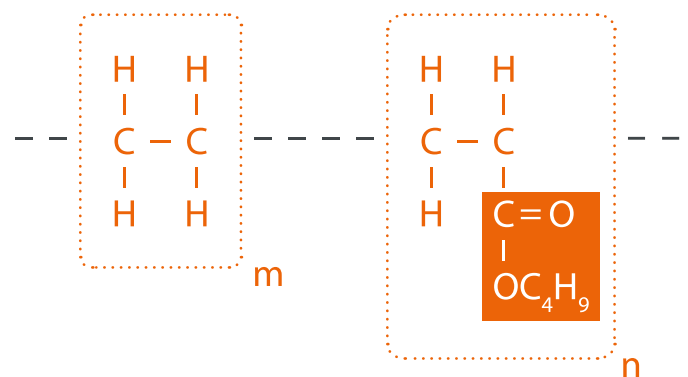


LUCOBIT PRODUCTS

Foams, foams, foams: with or without crosslinking, extruded or moulded, physically- or chemically foamed, batch or continuous process. LUCOBIT AG products are suitable for any foam application. They provide:

- Low compression set
- Exceptional cushioning characteristics
- Means of controlling foam's cell size
- Excellent low temperature behavior
- High COF

The majority of LUCOBIT AG products are based on EBA = Ethylenebutylacrylate. The repeat unit of this copolymer is shown in the Figure to your right. This structure explains many of its unique properties as explained on the next page.



CASE STUDY

CUSTOMER

Major producer of crosslinked polyethylene foam.

PREVIOUS SITUATION

LDPE and EVA based foam.

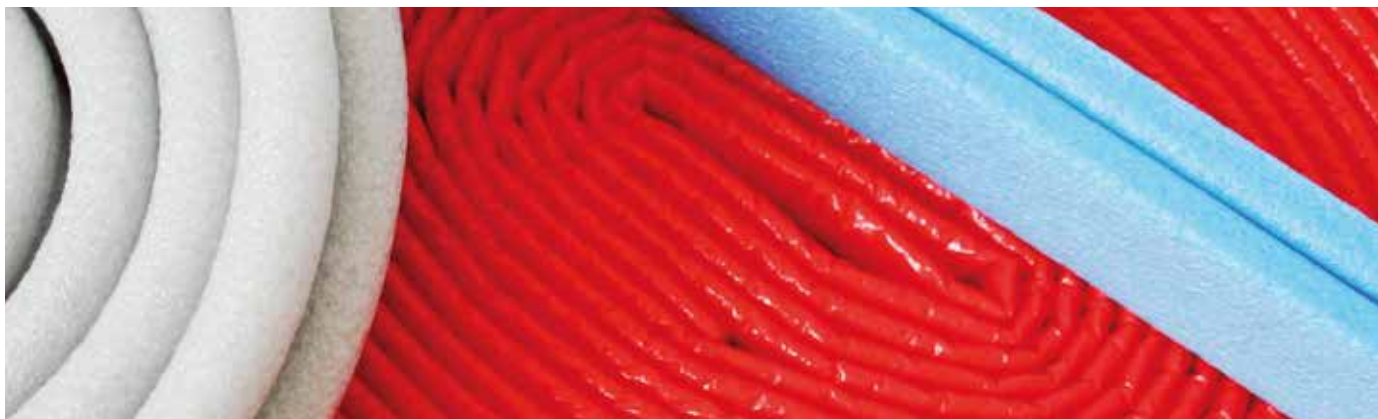
SOLUTION NOW

LDPE and Lucofin® 1400HN.

BENEFITS TO THE CUSTOMER

- Cushioning comfort improved by 10 % due to more effective energy absorption
- Foam Cell Size reduction combined with improved thermal insulation
- Reduction of Compression Creep by 5% resulting in better long term properties

PRODUCTS – THAT MAKE YOU SUCCESSFUL

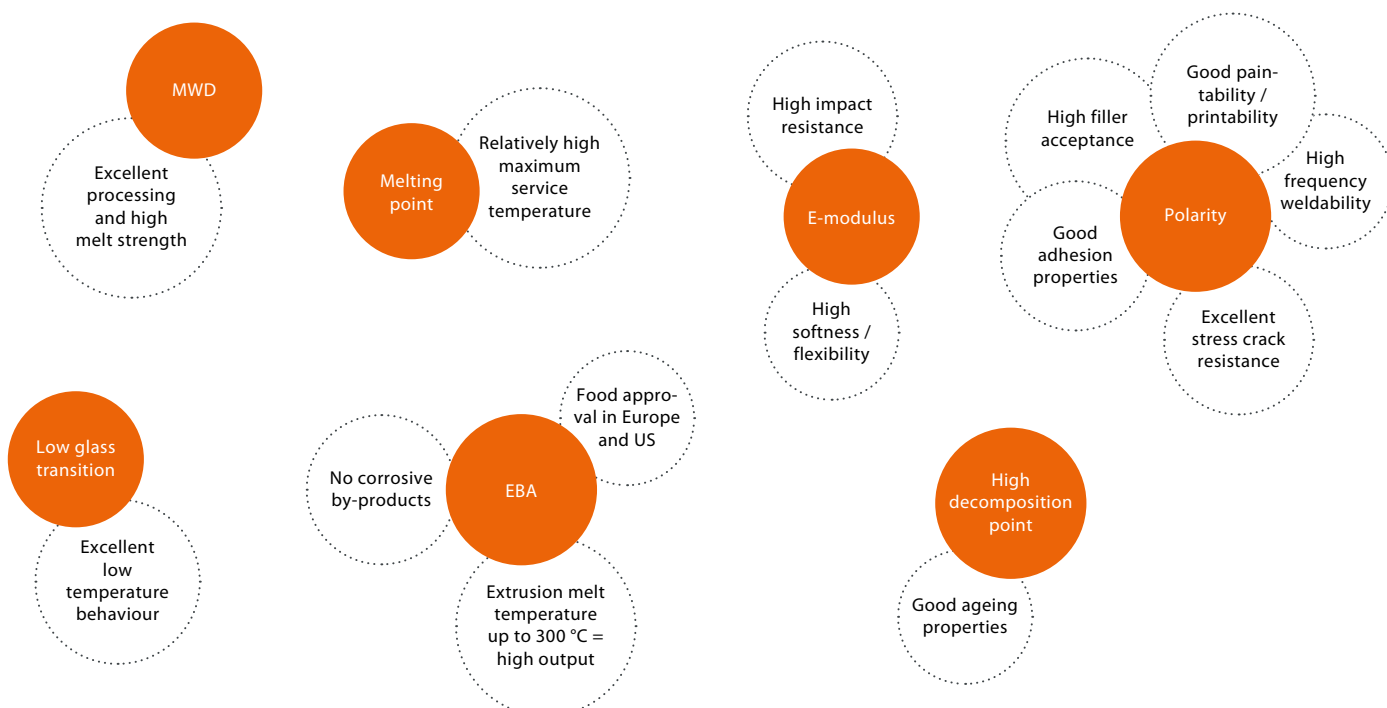


ADVANTAGES OF LUCOBIT AG PRODUCTS

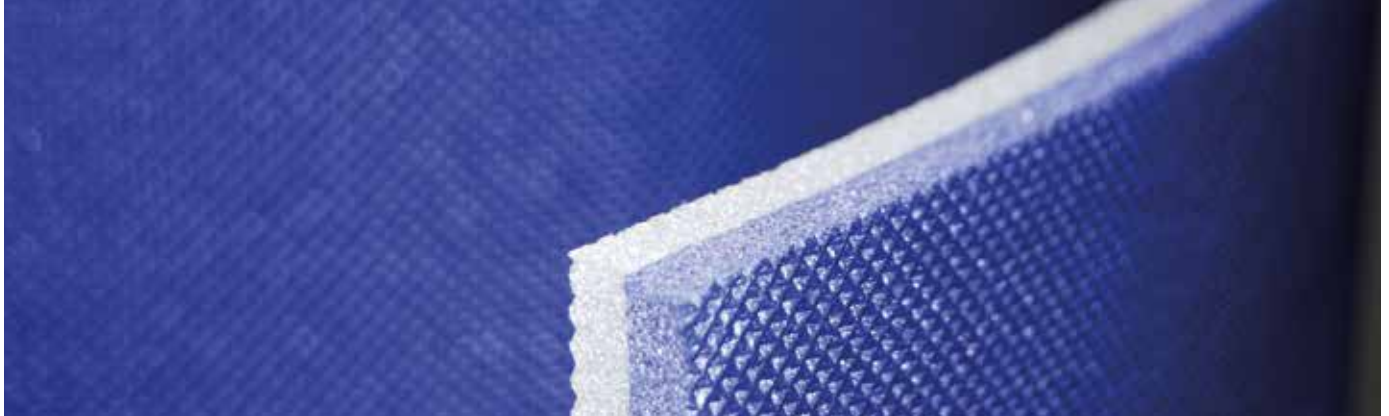
LUCOBIT AG markets specialty plastics based on flexible polyolefin copolymers under the trade name Lucofin®. For many years, these proved to be again and again as high quality products our customers learned to appreciate and value.

Over time, we added grafted and non-grafted and specialty grades to our product portfolio. Many of our customers tested them and showed their exemplary cost-effectiveness retaining expected characteristics in most applications compared to other alternatives fulfilling required technical specifications. Especially the comparison to other plastomers), Lucofin® EBA's proved to be the superior solution.

The following Figure illustrates and exemplifies key properties and the resulting advantages of Lucofin® 1400 HN, 1400 MN, 1400 PN and their grafted equivalents. Taking these factors into account, cost effectiveness of Lucofin® EBA's becomes apparent and consequently constitutes the best solution.



LOW TEMPERATURE PROPERTIES OF POLYETHYLENE FOAM



LDPE foams are semi-rigid. To bestow more softens without resiliency to LDPE foams, 10-50% polar copolymers are often added as part of the formulation. Suitable polar copolymers are ethylenebutylacrylate (EBA), ethylenemethylacrylate (EMA),... and ethylenevinylacetate (EVA). In order to be suitable there are specific applications and markets such as automotive, civil engineering and aerospace, where excellent low temperature properties are often required.

The polymer's glass transition temperature (T_g) indicates the 'transition' from a hard and rigid to a rubber-like state. A low T_g therefore is important to retain soft and flexible characteristics at ambient conditions which constitute most applications.

The left-hand Figure below compares the T_g's of some common polar copolymers. LUCOBIT AG's EBAs prove to be the choice for low temperature applications.

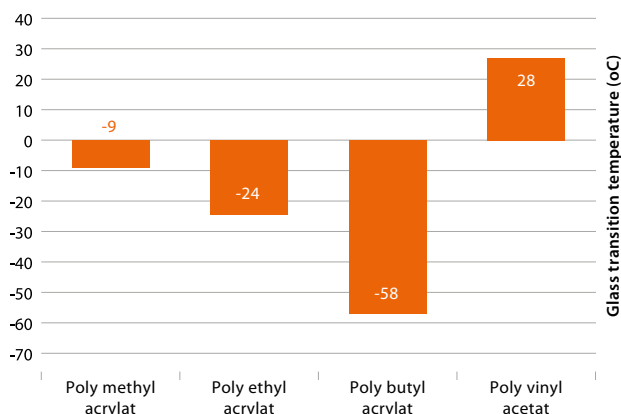
The right-hand Figure below shows the E-modulus (elastic modulus) of EBA and EVA as a function of temperature.

Therefore, EBA blended with LDPE is an excellent choice to produce soft and resilient foams retaining their properties at very low temperatures.

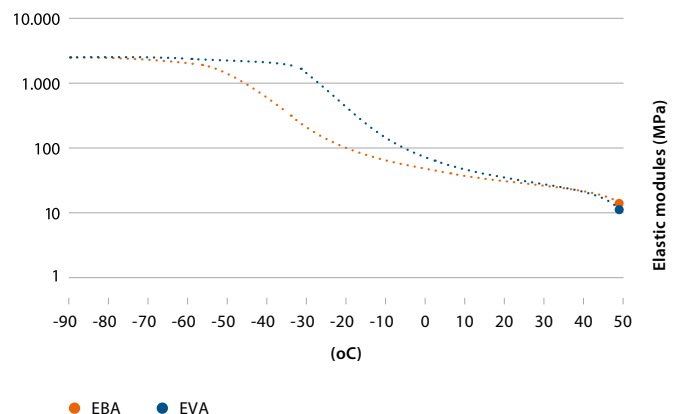
Applications for EBA/LDPE foams include, among many others, pipe insulations, expansion joints, gasket, and camping mats.

All LUCOBIT AG's Lucofin® grades are based on EBA rendering them perfectly suited for use in all polyolefin foams especially in those foams requiring superior low temperature properties.

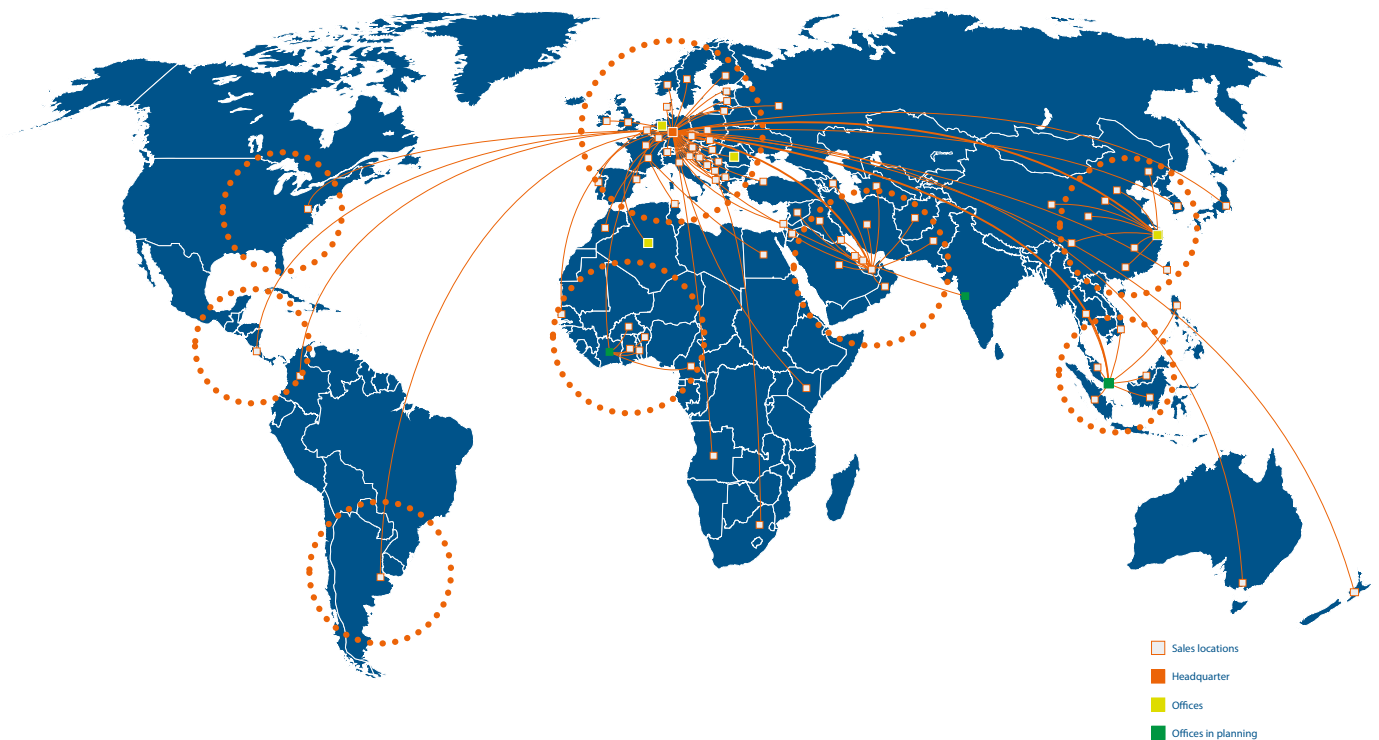
Glass transition temperature of various polar copolymers



EBA / EVA Dynamical Mechanical Analysis



LOCATIONS



LUCOBIT Aktiengesellschaft
Basell Polyolefine GmbH / Brühler Str. 60 • B100
D-50389 Wesseling
Phone +49 2236 / 37859-0
Fax +49 2236 / 37859-99
info@lucobit.de
www.lucobit.com

Note

The information provided in this document is based on our product tests and present technical knowledge. It does not release purchasers from the responsibility of carrying out their receiving inspections. Neither does it imply any binding assurance of suitability of our products for a particular purpose. As LUCOBIT cannot anticipate or control the many different conditions under which this product may be processed and used this information does not relieve processors from their own tests and investigations. Any proprietary rights as well as existing legislation shall be observed.